इंटरनेट मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

"जानने का अधिकार, जीने का अधिकार"
Mazdoor Kisan Shakti Sangathan
"The Right to Information, The Right to Live"

"पुराने को छोड नये के तरफ"
Jawaharlal Nehru
"Step Out From the Old to the New"

IS 13360-5-3 (1999): Plastics - Methods of testing, Part 5: Mechanical Properties , Section 3 Determination of tensile properties - Test conditions for films and sheets [PCD 12: Plastics]

"ज्ञान से एक नये भारत का निर्माण"
Satyanarayan Gangaram Pitroda
"Invent a New India Using Knowledge"

Act Number 22 of 2005
The Indian Parliament
RIGHT TO INFORMATION

Made Available By
Public.Resource.Org

"ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है"
Bhartṛhari—Nītiśatakam
"Knowledge is such a treasure which cannot be stolen"

BLANK PAGE

BRUTUM FULMEN

IGNORANTIA JURIS NON EXCUSAT

PROTECTED BY COPYRIGHT

IS 13360 (Part 5/Sec 3) : 1999
ISO 527-3 : 1995

भारतीय मानक

प्लास्टिक – परीक्षण पद्धतियाँ

भाग 5 यांत्रिक गुणधर्म

अनुभाग 3 तनन गुणधर्म ज्ञात करना—परतों और चद्दरों की परीक्षण शर्तें

Indian Standard

PLASTICS - METHODS OF TESTING

PART 5 MECHANICAL PROPERTIES

Section 3 Determination of Tensile Properties — Test Conditions for Films and Sheets

ICS 83.140.10:19

©BIS 1999

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

February 1999

Price Group 3

Methods of Test for Plastics Sectional Committee, PCD 23

NATIONAL FOREWORD

This Indian Standard (Part 5/Sec 3) which is identical with ISO 527-3: 1995 'Plastics - Determination of tensile properties - Part 3: Test conditions for films and sheets' issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on the recommendation of Methods of Test for Plastics Sectional Committee and approval of the Petroleum, Coal and Related Products Division Council.

The text of the ISO standard has been approved as suitable for publication as Indian Standard without deviations. Certain conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

a) Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'.

b) Comma (,) has been used as a decimal marker in the International Standard while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

In the adopted standard, reference appears to certain International Standards for which Indian Standards also exist. The corresponding Indian Standards which are to be substituted in their place are listed below along with their degree of equivalence for the editions indicated:

International Standard	*Corresponding Indian Standard*	*Degree of Equivalence*
ISO 527-1:1993 Plastics — Determination of tensile properties - Part 1: General principles	IS 13360 (Part 5/Sec 1): 1996 Plastics - Methods of testing : Part 5 Mechanical properties, Section 1 Determination of tensile properties — General principles	Identical
ISO 4591:1992 Plastics— Film and sheeting — Determination of average thickness of a sample, and average thickness and yield of a roll, by gravimetric techniques (gravimetric thickness)	Nil	—
ISO 4593 : 1993 Plastics— Film and sheeting — Determination of thickness by mechanical scanning	Nil	--

In the case of ISO 4591 and ISO 4593, the Technical Committee responsible for the preparation of this standard has reviewed its contents and has decided that they are acceptable for use in conjunction with this standard.

In reporting the results of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2 : 1960 'Rules for rounding off numerical values *{revised)'.*

IS 13360 (Part 5/Sec 3) : 1999
ISO 527-3 : 1995

Indian Standard

PLASTICS - METHODS OF TESTING

PART 5 MECHANICAL PROPERTIES

Section 3 Determination of Tensile Properties — Test Conditions for Films and Sheets

1 Scope

1.1 This part of ISO 527 specifies the conditions for determining the tensile properties of plastic films or sheets less than 1 mm thick, based upon the general principles given in part 1.

NOTE 1 For sheets greater than 1 mm thick, the user is referred to part 2 of this International Standard.

1.2 See ISO 527-1, subclause 1.2.

1.3 This part of ISO 527 is not normally suitable for ' determining the tensile properties of:

a) cellular materials;

b) plastics reinforced by textile fibres.

1.4 See ISO 527-1, subclause 1.5.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of. this part of ISO 527. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 527 are encouraged to investigate the possibility of applying the most recent editions of the standards indie ad below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 527-1:1993, *Plastics — Determination of tensile properties — Part 1: General principles.*

ISO 4591:1992, *Plastics — Film and sheeting — Determination of average thickness of a sample, and average thickness and yield of a roll, by gravimetric techniques (gravimetric thickness).*

ISO 4593:1993, *Plastics — Film and sheeting — Determination of thickness by mechanical scanning.*

3 Principle

See ISO 527-1, clause 3.

4 Definitions

See ISO 527-1, clause 4.

5 Apparatus

See ISO 527-1, clause 5, subject to the following additional requirements:

In 5.1.2, the tensile-testing machine shall be capable of maintaining the speeds of testing as specified in table 1 of ISO 527-1. It is normal for films and sheets to be tested at a speed of 5 mm/min, 50 mm/min, 100mm/min, 200 mm/min, 300 mm/min or 500 mm/min. The information contained in ISO 527-1, subclause 9.6, also applies.

In 5.1.5, when testing thin sheets or film material, the specimen shall not carry the weight of the extensometer.

In 5.2, devices complying with the requirements in ISO 4593 shall be used for measuring the thickness, except in the case of very thin film (less than 0.01 mm thick) or embossed film. In those cases, the thickness shall be determined by the method specified in ISO 4591. When ISO 4591 is used, the average thickness of the film sample shall be taken as the thickness of the test specimen.

6 Test specimens

6.1 Shape and dimensions

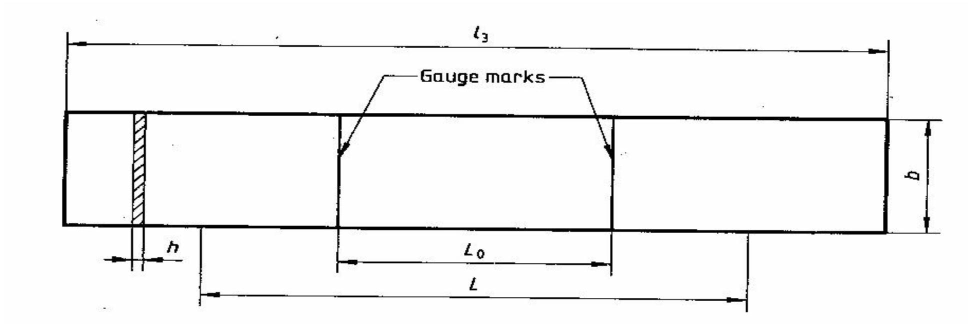
6.1.1 The preferred form of test specimen for the determination of tensile properties by this method is a strip 10 mm to 25 mm wide and not less than 150 mm long (specimen type 2 — see figure 1), having two parallel gauge marks, 50 mm apart, on the central portion of the specimen.

Some film materials have a very high elongation at break which may result in them being outside the stretching capacity of the testing machine. In such cases, it is permissible to reduce the initial distance between the grips to 50 mm.

6.1.2 When required by the specification for the material under test or for routine quality-control tests, dumb-bell specimen types 5, 1B and 4 of the shape and dimensions shown in figures 2, 3 and 4 may be used. These specimens are convenient to produce and permit rapid quality-control testing.

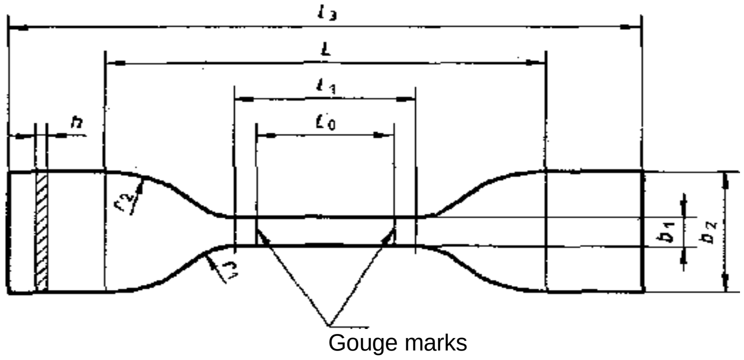
Specimen type 5 (figure 2) is recommended for film and sheet with a very high strain at break. Specimen type 4 is recommended for other types of flexible thermoplastic sheet.

Specimen type 1B (figure 3) is recommended for rigid sheets



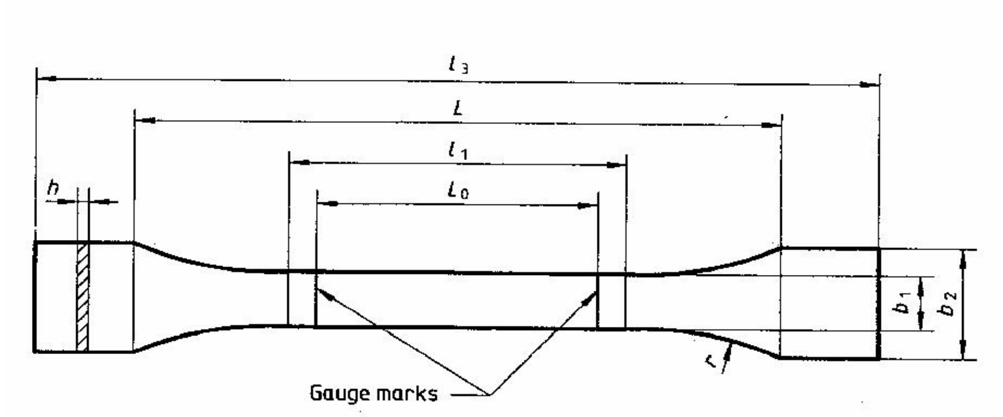
B	Width: 10 mm to 25 mm
h	Thickness: ^ 1 mm
L_O	Gauge length: 50 mm ± 0,5 mm
L	Initial distance between grips: 100 mm ± 5 mm
l_3	Overall length: > 150 mm

Figure 1 — Specimen type 2



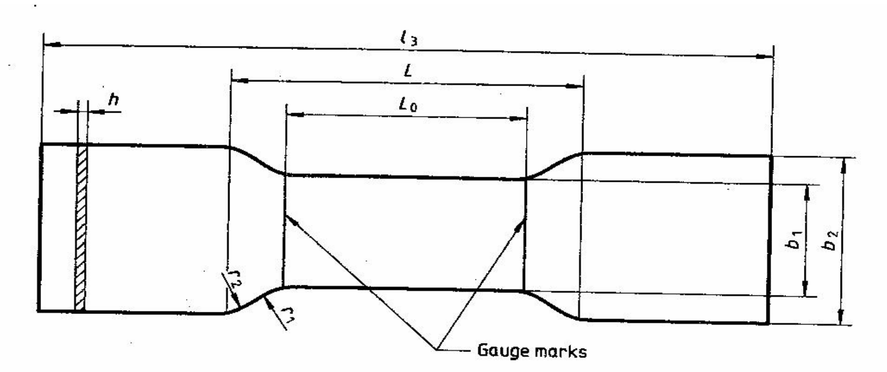
b_1	Width of narrow parallel-sided portion: 6 mm ± 0,4 mm
b_2	Width at ends: 25 mm ± 1 mm
H	Thickness: < 1mm
L_0	Gauge length: 25 mm ± 2mm
l1	Length of narrow parallel-sided portion: 33 mm ± 2 mm
L	Initial distance between grips: 80 mm ± 5 mm
l3	Overall length > 115 mm
r_1	Small radius: 14 mm ± 1 mm
r_2	Large radius: 25 mm ± 2 mm

Figure 2 – Specimen type 5



B1	Width of narrow parallel-sided portion: 10 mm ± 0.2 mm
b_2	Width at ends: 20 mm ± 0.5 mm
h	Thickness: < 1 mm
LQ	Gauge length: 50 mm ± 0.5 mm
l]	Length of narrow parallel-sided portion: 60 mm ±0.5 mm
L	Initial distance between grips: 115 mm + 5 mm
l3	Overall length: > 150 mm
r	Radius: > 60 mm

Figure 3 — Specimen type 1B



b_1	Width of narrow parallel-sided portion: 25.4 mm ± 0.1 mm
b_2	Width at ends: 38 mm
H	thickness: < 1 mm
L_0	Gauge length: 50 mm ± 0.5 mm
L	Initial distance between grips: 73.4 mm
l_3	Overall length: 152 mm
r_1	Small radius: 22 mm
r_2	Large radius: 25.4 mm

Figure 4 — Specimen type 4

6.2 Preparation of specimens

6.2.1 The test specimens described in 6.1.1 shall be cut or punched so that the edges are smooth and free from notches; examination with a low-power magnifier is recommended to check the absence of notches. Razor blades, suitable paper cutters, scalpels or other devices capable of cutting the specimens to the proper width and producing straight, clean, parallel edges with no visible imperfections shall be used. Punch dies shall be kept sharp by regular honing, and a suitable backing material shall be used with punch dies to ensure a clean-cut edge.

6.2.2 The test specimens described in 6.1.2 shall be obtained by the use of punch, dies, using suitable backing material to ensure a clean-cut edge. Dies shall be kept sharp by regular honing, and the edges of the specimen shall be examined with a low-power magnifier to ensure the absence of notches. Discard any specimen with obvious imperfections on the cut edges.

6.3 Gauge marks

See ISO 527-1, subclause 6.3.

The marking device used to produce the gauge marks shall have two parallel edges which are ground smooth and true, 0,05 mm to 0,10 mm wide at the *edge* and bevelled at an angle of not more than .15°. An ink stamp may also be used to apply ink to the area of the gauge marks, before or after producing them with the marking device, using an ink of a suitable contrasting colour that has no deleterious effect on the film being tested.

6.4 Checking the specimens

Discard any test specimen with obvious imperfections on the cut edges.

6.5 Anisotropy

The properties of certain types of film material may vary with direction in the plane of the film (anisotropy). In such cases, it is essential to prepare two groups of test specimens with their major axes respectively parallel and perpendicular to the direction of orientation of the film.

7 Number of specimens

See ISO 527-1, clause 7.

8 Conditioning

See ISO 527-1, clause 8.

9 Procedure

See ISO 527-1, clause 9.

10 Calculation and expression of results

See ISO 527-1, clause 10, except for "10.3 Modulus calculation", and "10.4 Poisson's ratio, /*".

11 Precision

The precision of the test method is not known because inter-laboratory data are not available. When inter-laboratory data are obtained, a precision statement will be added at the following revision.

12 Test report

The test report shall include the following information:

a) a reference to this part of ISO 527, including the type of specimen and the test speed, written in the following format:

Tensile test ISO 527-3/1B/50

Type of specimen ---------------------------- —------- —I

Test speed in millimetres per minute ------------------------

b) to q) see ISO 527-1, clause 12, b) to q)

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act^* 1986 to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Copyright

BJS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade .designations. Enquiries relating to copyright be addressed to the Director (Publication), BIS.

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of'BIS Handbook* and'Standards Monthly Additions'.

This Indian Standard has been developed from Doc: No. PCD 23 (1569).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones: 323 01 31,323 33 75; 323 94 02

Telegrams: Manaksanstha
(Common to all offices)

Regional Offices:

		Telephone
Central	Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110002	323 7617,323 38 41
Eastern	1/14 C.I.T. Scheme VIIM, V.I.P. Road, Maniktola CALCUTTA 700054	f 337 84 99,337 85 61 1337 8626,337 9120
Northern :	SCO 335-336, Sector 34-A, CHANDIGARH 160022	60 38 43 60 20 25
Southern :	C.I.T. Campus, IV Cross Road, CHENNAI600113	f 235 0216,235 04 42 12351519,2352315
Western :	Manakalaya, E9 MIDC, Marol, Andheri (East) MUMBAI400093	/832 92 95, 832 78 58 183278 91,8327892

Branches : AHMADABAD. BANGALORE. BHOPAL. BHUBANESHWAR. COIMBATORE. FARIDABAD. GHAZJABAD. GUWAHATI. HYDERABAD. JAIPUR. KANPUR. LUCKNOW, NAGPUR. PATNA. PUNE. THIRUVANANTHAPURAM.

Printed at Siraco Printing Press, Delhi, India